CLAIMS

1. Method for encoding a source sequence of symbols ($\underline{u}$) as an encoded sequence, characterised in that it includes steps according to which:

- a first operation is performed of division into sub-sequences and encoding (508), consisting of dividing said source sequence ($\underline{u}$) into p_1 first sub-sequences ($\underline{U}_i$), p_1 being a positive integer, and encoding each of the first sub-sequences ($\underline{U}_i$) using a first circular convolutional encoding method;

- an interleaving operation (506) is performed, consisting of interleaving said source sequence ($\underline{u}$) into an interleaved sequence ($\underline{u}^*$); and

- a second operation is performed of division into sub-sequences and encoding (507), consisting of dividing said interleaved sequence ($\underline{u}^*$) into p_2 second sub-sequences ($\underline{U}'_i$), p_2 being a positive integer, and encoding each of said second sub-sequences ($\underline{U}'_i$) by means of a second circular convolutional encoding method;

at least one of the integers p_1 and p_2 being strictly greater than 1 and at least one of said first sub-sequences ($\underline{U}_i$) not being interleaved into any of said second sub-sequences ($\underline{U}'_j$).

2. Encoding method according to Claim 1, characterised in that said first or second circular convolutional encoding method includes:

- a pre-encoding step, consisting of defining the initial state of the encoding method for the sub-sequence in question, so as to produce a pre-encoded sub-sequence, and

- a circular convolutional encoding step.

3. Encoding method according to Claim 2, characterised in that said pre-encoding step for one of said first sub-sequences ($\underline{U}_i$) and said circular convolutional encoding step for another one of said first sub-sequences ($\underline{U}_j$) already pre-encoded are performed simultaneously.

4. Encoding method according to any one of the preceding claims, characterised in that the integers p_1 and p_2 are equal.

5. Encoding method according to any one of the preceding claims, characterised in that the sizes of all the sub-sequences are identical.

6. Encoding method according to any one of the preceding claims, characterised in that said first and second circular convolutional encoding methods are identical.

7. Encoding method according to any one of the preceding claims, characterised in that it further includes steps according to which:

- an additional interleaving operation is performed, consisting of interleaving the parity sequence ($\underline{v}_1$) resulting from the first operation of dividing into sub-sequences and encoding (508); and

- a third operation is performed of division into sub-sequences and encoding, consisting of dividing the interleaved sequence, obtained at the end of the additional interleaving operation, into p_3 third sub-sequences ($\underline{U}''_i$), p_3 being a positive integer, and encoding each of said third sub-sequences ($\underline{U}''_i$) by means of a third circular convolutional encoding method.

8. Device for encoding a source sequence of symbols ($\underline{u}$) as an encoded sequence, characterised in that it has:

- first means for dividing into sub-sequences and encoding (205, 202), for dividing said source sequence ($\underline{u}$) into p_1 first sub-sequences ($\underline{U}_i$), p_1 being a positive integer, and for encoding each of said first sub-sequences ($\underline{U}_i$) by means of first circular convolutional encoding means;

- interleaving means (203), for interleaving said source sequence ($\underline{u}$) into an interleaved sequence ($\underline{u}^*$); and

- second means for dividing into sub-sequences and encoding (206, 204), for dividing said interleaved sequence ($\underline{u}^*$) into p_2 second sub-sequences ($\underline{U}'_i$), p_2 being a positive integer, and for encoding each of said second sub-sequences ($\underline{U}'_i$) by means of second circular convolutional encoding means;

at least one of the integers p_1 and p_2 being strictly greater than 1 and at least one of said first sub-sequences ($\underline{U}_i$) not being interleaved into any of said second sub-sequences ($\underline{U}'_j$).

9. Encoding device according to Claim 8, characterised in that said first or second circular convolutional encoding means have:

- pre-encoding means, for defining the initial state of the encoding means for the sub-sequence in question, so as to produce a pre-encoded sub-sequence, and

- circular convolutional encoding means proper.

10. Encoding device according to Claim 9, characterised in that said pre-encoding means process one of said first sub-sequences ($\underline{U}_i$) at the same time as said circular convolutional encoding means proper process another of said first sub-sequences ($\underline{U}_j$) already pre-encoded.

11. Encoding device according to Claim 8, 9 or 10, characterised in that the integers p_1 and p_2 are equal.

12. Encoding device according to any one of Claims 8 to 11, characterised in that the sizes of all the sub-sequences are identical.

13. Encoding device according to any one of Claims 8 to 12, characterised in that said first and second circular convolutional encoding means are identical.

14. Encoding device according to any one of Claims 8 to 13, characterised in that it further has:

- additional interleaving means, for interleaving the parity sequence ($\underline{v}_1$) supplied by the first means of dividing into sub-sequences and encoding (205, 202); and

- third means of dividing into sub-sequences and encoding, for dividing the interleaved sequence, supplied by said additional interleaving means, into p_3 third sub-sequences ($\underline{U''}_i$), p_3 being a positive integer, and for encoding each of said third sub-sequences ($\underline{U''}_i$) by means of third circular convolutional encoding means.

15. Method for decoding a sequence of received symbols, characterised in that it is adapted to decode a sequence encoded by an encoding method according to any one of Claims 1 to 7.

16. Decoding method according to Claim 15, using a turbodecoding, characterised in that there are performed iteratively:

- a first operation of dividing into sub-sequences (711), applied to the received symbols representing the source sequence ($\underline{u}$) and a first parity sequence ($\underline{v}_1$), and to the a priori information ($\underline{w}_4$) of the source sequence ($\underline{u}$);

- for each triplet of sub-sequences representing a sub-sequence encoded by a circular convolutional code, a first elementary decoding operation (703), adapted to decode a sequence encoded by a circular convolutional code and supplying a sub-sequence of extrinsic information on a sub-sequence of the source sequence ($\underline{u}$);

- an operation of interleaving (705) the sequence ($\underline{w}_1$) formed by the sub-sequences of extrinsic information supplied by said first elementary decoding operation (703);

- a second operation of dividing into sub-sequences (712), applied to the received symbols representing the interleaved sequence ($\underline{u}^*$) and a second parity sequence ($\underline{v}_2$), and to the a priori information ($\underline{w}_2$) of the interleaved sequence ($\underline{u}^*$);

- for each triplet of sub-sequences representing a sub-sequence encoded by a circular convolutional code, a second elementary decoding operation (706), adapted to decode a sequence encoded by a circular convolutional code and supplying a sub-sequence of extrinsic information on a sub-sequence of the interleaved sequence ($\underline{u}^*$);

- an operation of deinterleaving (708) the sequence ($\underline{w}_3$) formed by the extrinsic information sub-sequences supplied by said second elementary decoding operation (706).

17. Device for decoding a sequence of received symbols, characterised in that it is adapted to decode a sequence encoded by means of an encoding device according to any one of Claims 8 to 14.

18. Decoding device according to Claim 17, using a turbodecoding, characterised in that it has:

- first means of dividing into sub-sequences (417), applied to the received symbols representing the source sequence ($\underline{u}$) and a first parity sequence ($\underline{v}_1$), and to the a priori information ($\underline{w}_4$) of the source sequence ($\underline{u}$);

- first elementary decoding means (404), operating on each triplet of sub-sequences representing a sub-sequence encoded by a circular convolutional code, for decoding a sequence encoded by a circular convolutional code and supplying a sub-sequence of extrinsic information on a sub-sequence of the source sequence ($\underline{u}$);

- means (405) of interleaving the sequence ($\underline{w}_1$) formed by the sub-sequences of extrinsic information supplied by said first elementary decoding means (404);

- second means of dividing into sub-sequences (419), applied to the received symbols representing the interleaved sequence ($\underline{u}^*$) and a second parity sequence ($\underline{v}_2$), and to the a priori information ($\underline{w}_2$) of the interleaved sequence ($\underline{u}^*$);

- second elementary decoding means (406), operating on each triplet of sub-sequences representing a sub-sequence encoded by a circular convolutional code, for decoding a sequence encoded by a circular convolutional code and supplying a sub-sequence of extrinsic information on a sub-sequence of the interleaved sequence ($\underline{u}^*$);

- means (407) of deinterleaving the sequence ($\underline{w}_3$) formed by the sub-sequences of extrinsic information supplied by said second elementary decoding means (406),

said means of dividing into sub-sequences (417, 419), of elementary decoding (404, 406), of interleaving (405) and of deinterleaving (407) operating iteratively.

19. Digital signal processing apparatus, characterised in that it has means adapted to implement an encoding method according to any one of Claims 1 to 7 and/or a decoding method according to Claim 15 or 16.

20. Digital signal processing apparatus, characterised in that it has an encoding device according to any one of Claims 8 to 14 and/or a decoding device according to Claim 17 or 18.

21. Telecommunications network, characterised in that it has means adapted to implement an encoding method according to any one of Claims 1 to 7 and/or a decoding method according to Claim 15 or 16.

22. Telecommunications network, characterised in that it has an encoding device according to any one of Claims 8 to 14 and/or a decoding device according to Claim 17 or 18.

23. Mobile station in a telecommunications network, characterised in that it has means adapted to implement an encoding method according to any one of Claims 1 to 7 and/or a decoding method according to Claim 15 or 16.

24. Mobile station in a telecommunications network, characterised in that it has an encoding device according to any one of Claims 8 to 14 and/or a decoding device according to Claim 17 or 18.

25. Device for processing signals representing speech, characterised in that it includes an encoding device according to any one of Claims 8 to 14 and/or a decoding device according to Claim 17 or 18.

26. Data transmission device having a transmitter adapted to implement a packet transmission protocol, characterised in that it includes an encoding device according to any one of Claims 8 to 14 and/or a decoding device according to Claim 17 or 18 and/or a device for processing signals representing speech according to Claim 25.

27. Data transmission device according to Claim 26, characterised in that said protocol is of the ATM type.

28. Data transmission device according to Claim 26, characterised in that said protocol is of the IP type.

29. Information storage means, which can be read by a computer or microprocessor storing instructions of a computer program, characterised in that it implements an encoding method according to any one of Claims 1 to 7.

30. Information storage means, which can be read by a computer or microprocessor storing instructions of a computer program, characterised in that it implements a decoding method according to Claim 15 or 16.

31. Information storage means, which is removable, partially or totally, which can be read by a computer or microprocessor storing instructions of a computer program, characterised in that it implements an encoding method according to any one of Claims 1 to 7.

32. Information storage means, which is removable, partially or totally, which can be read by a computer or microprocessor storing instructions of a computer program, characterised in that it implements a decoding method according to Claim 15 or 16.

33. Computer program containing sequences of instructions, characterised in that it implements an encoding method according to any one of Claims 1 to 7.

34. Computer program containing sequences of instructions, characterised in that it implements a decoding method according to Claim 15 or 16.